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STATUS REPORT ON
AGENA D

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FOREWORD

In conformance with directives received from Hq USAF and in recognition of the urgency attached to the satisfactory accomplishment of the accelerated Agena D Program, certain extra-ordinary and unusual technical and contractual relationships were established with the Lockheed Missiles & Space Company, Sunnyvale, California. It is the purpose of this report to record these relationships, to analyze the effectiveness of this unique management approach in light of the results obtained to date and to present summary conclusions.

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INTRODUCTION

Early in 1961, increased activity and mounting costs of space programs forced recognition by AFSSD of the necessity for reducing cost and increasing flexibility through standardization of the Agena stage. In order to establish the technical feasibility of this approach, on 30 June 61, the Agena Standardization Study was authorized. The results of this study were favorable and after approval by Hq USAF and DOD, on 25 August 61 the U. S. Air Force awarded Contract AF 04(695)-21 to the Lockheed Missiles and Space Company for the design, development, and production of twelve Agena D satellite vehicles which were to be standard in nature and capable of being used with a minimum degree of change in various satellite programs. First launch was scheduled for January 1963.

On 17 October 61 the Honorable Dr. Joseph V. Charyk, Under Secretary of the Air Force, appointed a special committee chaired by Mr. Clarence L. Johnson to investigate ways and means of providing a more reliable Agena on an accelerated schedule. This committee reviewed the approach proposed under the standard Agena concept and the capacity of the Lockheed Missiles and Space Company for accelerating the approved schedule. It was the conclusion of the committee that a more reliable standard Agena could be produced to support a June 62 first launch provided that extraordinary and unusual technical and contractual relationships were established and rigorously adhered to by both the Contractor and the Government. The management principles proposed by the Johnson Committee were reviewed by Hq USAF and approved as the basis for program management. In general, these ground rules apply a streamlined AF/Contractor management concept and include a DX priority, reduction in formal procedures, exclusion area in which to perform the work, and extraordinary program management channels. To insure compliance by both parties, these 'ground rules' were actually made a preamble to the contractual work statement for the accelerated Agena D program.

The prime objectives of the accelerated Agena D program are:

1. To produce a more reliable standardized basic vehicle capable of performing essential ascent and/or orbital functions derived from common mission requirements of the following programs: 162, 698BJ, 698AL, 698BK, 461, 706, 823, 695AA, 369, Rebound and Ego in accord with the accelerated schedule and within the allocated budget.

2. To provide a fixed-price procurement source for Agena D vehicles with a production capacity of five vehicles per month.

1. CONTRACTS

A. **Background**. In compliance with guidance received from Hq USAF (Reference Hq USAF messages (1) AFSDC-F 82350 dated

30 Nov 61, (2) AFSPM 80799 dated 22 Nov 61, and (3) AFSSC-EQ 90915 dated 5 Jan 62) two separate contracts have been established to accomplish the stated objectives of the accelerated Agena D program. The basic development/engineering contract (AF 04(695)-21) provides the necessary engineering capability and industrial base for the design, development, fabrication, assembly, qualification, and test of twelve prototype Agena D flight vehicles with initial delivery to support a June 1962 first launch. This contract also provides as a primary objective, creation of the 'Procurement Package' to permit a fixed price procurement and the creation of a capability for production at the rate of five Agena D vehicles per month. The follow-on production contract (AF 04(695)-68) has been established to support an initial delivery of 39 Agena D vehicles with an initial production rate established as four vehicles per month.

B. Development/Engineering Contract

1. General. The Development/Engineering Contract (AF 04(695)-21) was written originally to support the standard Agena program authorized on 25 August 61. In order to accomplish the objectives of the acceleration, however, the management approach to this contract was completely reoriented on 7 November 61. In essence, the Lockheed Missiles and Space Company, in response to Air Force guidance, completely reoriented the organization responsible for management of the vehicle design, fabrication,

assembly, and test which was in being to support the production of the Agena B. From the outset it was recognized that it would be necessary to assign one individual across-the-board responsibility for all phases of the Agena D program. Accordingly, LMSC proposed the creation of what might be considered a company within a company, establishing the Agena D program office having complete Agena D responsibilities and reporting directly to the Vice President and General Manager, Space Systems. This organizational approach was dramatic and effective. As much as any other single factor, it has been responsible for the quick response time which has been demonstrated in the performance of LMSC to date. The basic R&D contract was definitized in such a manner that it encompassed all of the requirements for the complete redesign and qualification of the Agena D vehicle. It authorizes the fabrication and use of development tools such as the Propulsion Test Vehicle which was utilized to proof test the orifice pressurization system and the dual start capability of the rocket engine, the Structural Test Vehicles which were utilized to concurrently qualify the forward equipment rack and the aft structure, and the Thermal Test Vehicle which was used to verify environmental acceptability of the design. Additionally, a Functional Test Mockup and necessary wood mockups were furnished. In addition, twelve prototype flight articles will be produced, qualified, and checked out under this contract, and provision has been made for the production of a Development Test Vehicle. The DTV will serve now and in the future as a means of installing, qualifying, and where necessary, hot firing, program peculiar and advanced development modifications in support of all programs utilizing the Agena D stage. In addition to the above, it is a requirement of the -21 contract that a manufacturing production capability be established which will permit production of Agena D vehicles at the rate of five vehicles per month on a fixed price contract.

2. Incentive Features of the Contract.

a. In conformance with DOD policy, it was established from the outset of the Agena D program that the research and development phase was to be contracted as a Cost Plus Incentive Fee contract.

b. The features of the negotiated incentive formula for computation of fee are as follows:

1. Division of Fee: Equal weight will be given to cost, schedule, and performance (1/3) each.

2. Costs: Based upon a target fee rate of 7% for cost and a contract target cost of $31, 713, 746, the Contractor will receive $739, 987 if the final contract cost is $31, 713, 746. If the final cost of the contract is 5% more than the target price, the Contractor's fee will be reduced by $31, 714; if 10% more, it will be reduced by $63, 428; if 15% more, it will be reduced by $116, 283

at which point fee rate reaches the minimum of 5%.

A like procedure applies to underruns. If the final cost is 5% less than the target price, the Contractor's fee is increased by $31,714; if 10% less, the fee will be increased by $63,428, etc.

3. Schedule: As to vehicle delivery, the Contractor will receive 9% or $951,412, based upon a target cost of $31,713,746, if all vehicles are delivered to contract delivery schedule. To permit correction of all reported discrepancies resulting from Air Force Acceptance inspections and to permit delivery of a 'clean' article, the delivery formula provides a two-week grace period without penalty; if late more than two weeks, the fee is decreased by .0222% of target cost per week for five weeks to a maximum penalty of .111% of target cost per vehicle. If all twelve vehicles are seven weeks or more late, the fee would be reduced to 5% of target cost or $528,562. A detailed procedure has been evolved to determine the actual date and time of 'final' acceptance and delivery for fee purposes.

4. Performance: One of the most significant and unique features of the negotiated incentive fee relates to the payment of the 1/3 fee based upon performance. The Contractor proposed and the Air Force accepted the principle that the Air Force would unilaterally rate the Contractor's performance. LMSC officials

suggested a set of criteria as the basis for rating which were similar but not identical to those finally arrived at through negotiation. It is now agreed that the 1/3 fee based upon performance shall be by a point rating system. If the Contractor's performance is rated the maximum of 60 points, the fee for performance will be based upon 9% of target cost of $31, 713, 746, or $951, 412; a performance rating of 30 points gets the target fee of 7% or $739, 987; a performance rating of 0 points gets the minimum rate of 5% or $528, 562.

An Air Force board composed of representatives of the using programs and the Agena D Program Office will be appointed by the Commander, AFSSD, to rate the Contractor's performance within 30 days of the launch of the twelfth prototype vehicle. The board will use the following criteria: 30 points for (1) Reliability, (2) Program Adaptability, (3) Ease of Checkout; 30 points for (1) Weight of Vehicle, (2) Ascent Performance.

Additionally, it has been mutually agreed between the Contractor and the Agena D Program Office that should failure to qualify all components of the Agena D vehicle prior to flight of each of the prototype vehicles delay the flight of any vehicle, a suitable adjustment of the performance fee will be made. This will be the first time that the Agena vehicle will be contractually required to have all components qualified for flight prior to flight.

C. Production Contract

1. General

a. Contract AF 04(695)-68 is intended to be a production contract, whereunder fixed-price redeterminable procurement will be accomplished on the basis of a procurement package developed under Contract AF 04(695)-21. This procurement package consists of a detail specification, an acceptance test specification, and the required vehicle drawings.

b. It is planned that the management of the -68 contract will be in compliance with standard Air Force production procurement regulations and that although it will not necessarily encompass all of the military specifications associated with standard Air Force procurement, it will satisfy completely the intent of those specifications.

c. This production contract will utilize directly the engineering output of Contract AF 04(695)-21. There will not be a redesign for production required since the AF 04(695)-21 contract will result in documentation of a qualified production configuration. This configuration will be considered a frozen configuration, and configuration control in accordance with AFSCM 375-1 will be enforced. Changes to the configuration will only be made with Air Force concurrence and will require contractual amendment to effect any changes.

D. Advanced Development Contract AF 04(695)-191.

1. How it relates to the -21 and -68 contracts. As stated above, the -21 contract provided twelve vehicles, but more important it provided for the technical effort necessary for the redesign, development and qualifying of the Agena into a standard ascent vehicle -- the Agena D. The technical effort under the -21 contract has already been significantly reduced and will be completely phased out by November 1962. Inasmuch as the -68 contract buys "chinese copies" of the Agena D developed under the -21 contract, no provision for further redesign and development will be provided under the -68 contract. In fact, it has been specifically excluded in an attempt to preclude changes and increase reliability and reduce vehicle cost. The production build up occurs concurrently with the development effort under the basic contract, and without an Advanced Development Contract an engineering void will occur in the LMSC Agena D organization if all engineering effort is allowed to be terminated at the conclusion of the development/engineering (-21) contract on 30 November 62. It is recognized that deficiencies will be discovered for which additional engineering effort and possibly redesign will be required; state-of-art advancements must be adapted to the Agena D and qualified prior to being incorporated into the Agena D production.

This is where the "follow on R&D" or advanced development contract fits into the Agena plan. An appropriate level of effort will be provided under this contract to maintain the required level of engineering support to the using programs.

II. PROGRAM GROUND RULES

A. Ground Rules. To accomplish the Agena D program the Johnson Committee basic ground rules have been implemented and governed the development of the Agena D. In general, these ground rules apply a streamlined AF/Contractor management concept and include a DX priority, reduction in formal procedures, inclosed area, and extraordinary program management channels. These ground rules are as follows:

1. A DX priority is assigned to the Agena D Program.

2. The engineering system shall be simplified, requiring only those drawings essential to tool, build and service the vehicle.

3. 50% final configuration freeze shall be accomplished by 1 December 1961.

4. Engineering and management level personnel for Program S-01A shall be located in an exclusion area immediately adjacent to the tooling and manufacturing area.

5. A rapid drawing release system (24 hours maximum) from the project engineer's approval to the manufacturing group shall be established.

6. Funding shall be adequate and timely.

7. Technical directive meetings involving large groups shall not be required. Air Force personnel shall work in close liaison with the LMSC Project Engineer so formal meetings are not required.

8. Reasonable overtime will be approved. After-the-fact approval is not precluded. (Pursuant to clause A-37 of the contract.)

9. Air Force approval of vendor selection shall be furnished on-the-spot at Sunnyvale. When single source procurement is necessary, justification of such action will be kept on file.

10. Tooling shall be of the simplest type that will achieve interchangeability as stated in the basic Agena D specification. No tool drawings or outside approval of tooling will be required.

11. Interchangeability on early Agena D's will be limited to major structural and equipment items. Doors, for instance, may require trim to fit.

12. The AF Director, Program S-01A, and the LMSC Program S-01A Director shall jointly review the specification problem and agree at the configuration conference to reduce the number involved to the minimum compatible with the minimum requirements for the construction of the Agena D.

III. ORGANIZATION

A. SSD Program Office. A small streamlined Air Force office organization was established. This office consisted of eight qualified and experienced personnel that were assigned with primary duty to the Agena D program. This organization was configured to accomplish both contract administration and engineering tasks associated with the development of the Agena D, reporting directly to SSD command level. The function of each organizational element is as follows:

1. Director S-01A - Directly responsible for the overall Air Force management, (plans, organizes, coordinates, controls and directs), all efforts of functional agencies and industries participating in the S-01A Program. Reports directly to the SSD Commander.

2. Deputy for Programming, Procurement and Production - Responsible to the Director, S-01A Program, for programming, procurement and production of the Agena D and its supporting AGE/STE.

a. Programming Branch - Responsible for establishing Agena D program requirements based upon the official Air Force Integrated Launch Schedules published by SSD; providing budget information to program offices pertaining to fund requirements for Program S-01A and for availability of funds for release to the contractor.

b. Procurement and Production Branch - Responsible for all aspects of the preparation, negotiation, definitization, release and management of contracts for Agena D, and responsible for production schedules for Agena D vehicles, optional equipment and spare parts;

for Agena D production progress surveillance; for facilities, inspection and acceptance.

3. Assistant to Director for Engineering - Responsible to the Director S-01A Program for planning, implementing, and surveillance over the engineering of the Agena D and its supporting AGE/STE.

a. Aerospace Ground Equipment Branch - Responsible for the Air Force management of contractor's engineering efforts during the design, development and test of Agena D Aerospace ground equipment and special test equipment to insure the technical adequacy and timely delivery of the equipment to support Air Force programs. Also responsible that vehicle test philosophy and procedures and the checkout equipment are compatible and will, during vehicle test, provide adequate technical data to permit acceptance of the Agena D vehicle.

b. Electronics Branch - Responsible for the Air Force management of contractor engineering efforts during the design, development, and test of Agena D guidance and control and electrical power requirements to insure the technical adequacy and timely delivery of the equipment to support Air Force programs.

c. Astro Vehicle Branch - Responsible for the Air Force management of contractor engineering efforts during the design, development, and test of Agena D structures and propulsion systems to insure the technical adequacy and timely delivery of the equipment to support Air Force programs.

B. Relationship with AFPR

1. In recognition of the urgency attached to the satisfactory

accomplishment of the S-01A program, it was mutually understood that extraordinary and unusual technical and contractual relationships were required. Consistent with the principle that the design, manufacture, and test of the end article within the critical program schedule could only be achieved through an unencumbered working relationship of engineering, procurement, inspection, manufacturing, logistics and support personnel, both the Air Force and LMSC Program Directors have authority to make 'on-the-spot' decisions both technical and contractual. With respect to contract administration, specifically identified tasks were monitored by selected individuals as set forth in a Memorandum of Understanding between the SPD and the AFPR.

2. The LMSC engineering and management personnel were located in an exclusion area in Building 151, immediately adjacent to the final assembly and checkout. The S-01A Air Force Program Office was located adjacent to this Agena D area in an exclusion area. Access to this Air Force office is available to using program personnel from both LMSC and the Air Force without interfering with the LMSC Agena D effort. Liaison with the LMSC Agena D activity, by and on behalf of the Air Force and contractor personnel during the contract period, is confined to a limited number of designated personnel who have free access to the entire activity at all times. Air Force access is restricted to the S-01A Program Office personnel and designated personnel from the AFPR Office. No other Air Force personnel, other than those specifically approved by the Air Force or LMSC Program Director, are permitted access to the Agena D exclusion area.

3. The resources of the Air Force Plant Representative Office were utilized on a streamlined basis in carrying out contract administration functions to assure satisfactory execution of the Agena D Program. Acting for and under the control of the Director, Program S-01A, the AFPR made decisions relative to the S-01A Program which were binding upon the contractor. Selected individuals from the AFPRO have been designated contact personnel for their responsible functional areas. These designated individuals have free access to USAF Program S-01A personnel and access to the exclusion area as necessary to perform the task assigned.

C. LMSC Management Organization

1. The contractor has placed the full support of the Corporation behind the Agena D Program. Within the LMSC Space Systems Division, he has established the Agena D Directorate, with broad and all-encompassing authority. This authority includes full control over operations which are normally organized on a plant-wide functional basis, including manufacturing. The LMSC Agena D Program Director's organization and his functions and responsibilities are as follows:

a. Basic Objectives: Develop, design and manufacture the Agena D vehicle, establishing management controls over all aspects of the Agena D program contract.

b. Functions and Responsibilities

(1). Serve as the principal representative of Space Systems Vice President and General Manager with the customer in negotiations and commitments for the Agena D Program.

(2) Perform the complete systems engineering and reliability function for the Agena D Program, including the direction and control of all systems design, flight sciences, and test planning.

(3) Perform all vehicle engineering for the Agena D Program, including all subsystem design for airframe and installations, propulsion, internal electrical systems, guidance and control, and selected communications and control equipment.

(4) Design or provide the technical direction for the design of Agena D checkout equipment.

(5) Perform Agena D systems tests.

(6) Manufacture of the Agena D vehicle, including electrical, structure, and final assembly in accordance with Agena D drawings and specifications. Provide production planning, tooling, and production control. Direct and control any manufacturing services required by the program.

(7) Plan, establish, and maintain an effective inspection system to provide compliance with the contractual and design requirements of the Agena D program.

(8) Establish a procurement system to provide for the analysis of material requirements, the procurement of material, control of inventories, and the receiving, storing, and distribution of incoming shipments.

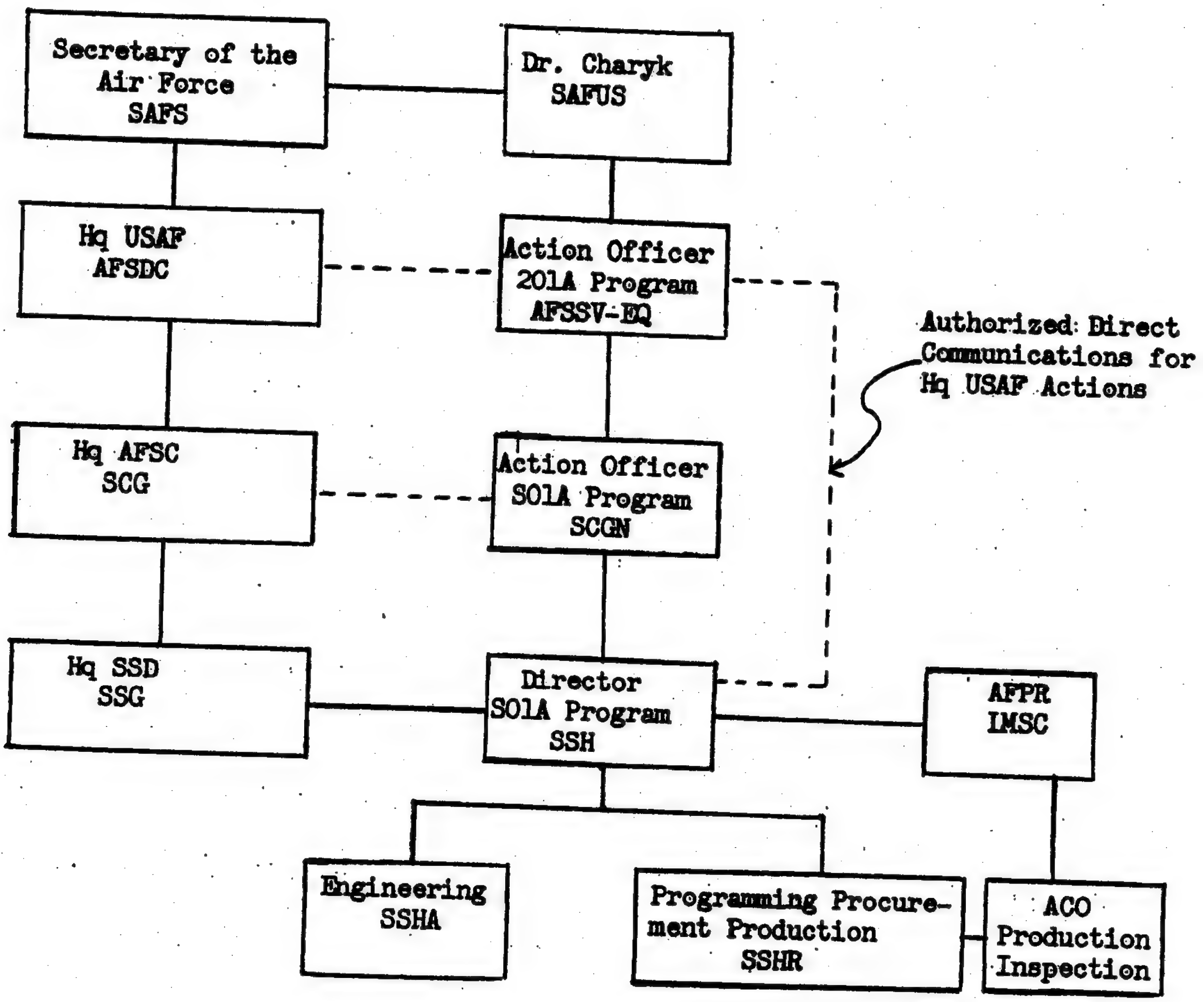
(9) Establish and maintain a management control system encompassing both program controls and administrative controls for the Agena D Program.

2. In addition to the foregoing responsibilities which have been delineated and agreed upon, the following were established as firm requirements of LMSC relative to the management of the Agena D Program.

a. The Contractor shall operate and maintain a logistics system which will insure the availability of spare parts and the repair of generated reparables.

b. The accounting system will provide for the segregation and reporting of basic vehicle development, product improvement, and logistics costs.

D. Command Channels


Secretary of the Air Force SAFS
Dr. Charyk SAFUS
Hq USAF AFSDC
Action Officer 201A Program AFSSV-EQ
Authorized Direct Communications for Hq USAF Actions
Hq AFSC SCG
Action Officer SO1A Program SCGN
Hq SSD SSG
Director SO1A Program SSH
AFPR LMSC
Engineering SSHA
Programming Procurement Production SSHR
ACO Production Inspection

IV. MANAGEMENT TECHNIQUES

A. Cost Management

1. **LMSC Internal Budgets.** The Air Force has established the incentive features of the contract in an effort to control cost and schedules and to insure performance. The effectiveness of the incentive features of the contract pertaining to cost immediately became evident when the Contractor established his Program Cost Accounting System. In order to delegate and fix management responsibility and authority, each of the major department heads, i. e., Systems Engineering and Reliability, Vehicle Engineering, Manufacturing, Inspection, Procurement, and Administration have been given individual operating budgets and overtime allocation. These budgets are reviewed weekly by the LMSC and Air Force Program Directors and are tracked against individual organizational allocations and master program milestones that should permit the Contractor to stay within costs allocated to the program. Experience to date has indicated that this method of high-lighting and controlling cost has permitted the Program Directors timely access to information which forewarns of potential overruns. This information has permitted corrective action to be taken in sufficient time to keep expenditures within the budget. It is significant to note that at this point in the program, approximately 80% of the costs have been incurred and program costs are still tracking an expenditure curve which will result in the Contractor completing the contract at the target cost established during the negotiation.

2. Agena D Accounting System. In early December 1961 it became necessary for the Agena D Program Office to cause the Contractor to establish a special accounting system for the Agena D program which would satisfy the Air Force Auditor General requirements for the CPIF contract. This has been accomplished to the satisfaction of the Auditor General and should permit the most accurate cost accumulation-vs-vehicle production thus far achieved at LMSC Sunnyvale. The main problem with the pre-Agena D accounting system at LMSC related to the pool charges, which were utilized to fund common or centralized facilities and services. It had been the approved technique to pro-rate these costs among appropriate customer contracts. In large measure, this accounting system limitation has been overcome by the straight line organization created by LMSC for the Agena D program and the fact that the LMSC Program Director has been able to negotiate with the remainder of the Corporation for services provided outside his control. The cost accounting system which has been established was mutually evolved among the Contractor, AFPRO, local representatives of the Auditor General's Office, and the Air Force Program Office. The breakdown of the accounting system is in sufficient detail such that the problem of cost analysis for the follow-on contract should be measurably reduced from that of previous development contracts negotiated with the Lockheed Missiles and Space Company.

3. Air Force Auditor General Representative. In order to insure Contractor compliance with the agreed procedures and the

proper interpretation of the cost accounting system to support the CPIF contract, the Agena D Program Director requested and was assigned early in the program, a full time representative of the Air Force Auditor General's Office as a member of the Agena D staff. This individual has had access to all cost information as it is accrued and is in a position to keep the Auditor General, AFPR, and Program Director informed of the Contractor's compliance with the agreed-to procedures and his current fiscal status at all times. In addition, at the request of the AFPRO, ACO, PCO, and Program Director, he has conducted special investigations and studies as required.

B. Program Control Channels.

1. In order to avoid the necessity of special reports and briefings by the Contractor to the Air Force Program Office during the course of the accelerated program, the LMSC Program Director extended to the Air Force Program Director and his staff an invitation to attend the weekly internal Lockheed program management meetings. This has become the accepted management tool of both the LMSC and Air Force Program Directors for obtaining a weekly status report on all features of the program. The 'pipeline meeting', as it is called, is held every Tuesday morning at 0800 hours and consists of a detailed discussion of the following:

a. Action items carried over from previous meetings.

b. Significant accomplishments since last meeting.

c. Problems which have arisen during the reporting period.

d. Items which must be accomplished to stay on schedule and within costs.

e. Review of technical status.

f. Review of subcontractor procurement status.

g. Review of logistic status.

h. Review of qualification program.

i. Financial and manpower status.

The attendees at the meeting consist of the members of the LMSC Program staff through management division level and such additional representation as may be required to adequately answer questions in connection with presentations which are to be given. The milestone technique of program control is utilized with every major segment of the program receiving as detailed review as is required. The presence of the Air Force Program Office at this internal LMSC management meeting has been a unique advantage for the Program staff for it has permitted the Air Force team to participate in the decision making process for all major issues that have arisen to date. Normally the Lockheed Program Director runs the meeting and gives the necessary administrative and technical direction to his staff in a manner that might be considered more appropriate if Air Force representatives were not present. It is common practice for the LMSC staff and the Air Force program team to present technical and administrative issues and differences that require mutual decision for resolution. By this technique, it has been possible for the Air Force Program Director and the LMSC Program Director to resolve differences on the spot and thereby, expedite the program objectives.

C. Technical Management Interface

1. In establishing the accelerated S-01A Program, two of the Johnson Committee ground rules had a marked effect on the internal LMSC exchange of technical information and the AF/LMSC technical working relationships. These were as follows:

a. "Engineering personnel shall be located in an enclosed area immediately adjacent to the tooling and manufacturing area.

b. "Technical directive meetings involving large groups shall not be required. Air Force personnel shall work in close liaison with the LMSC Project Engineer so formal meetings are not required."

2. The LMSC Agena D engineering staff was selected from the existing, experienced LMSC engineering personnel. This staff was moved to an enclosed area which required a special pass to obtain access. These measures were taken to permit the proper concentration of effort and to eliminate interruption by Non-Agena D personnel. A special liaison group was established to provide information to the various using programs.

3. It was realized that the normal Air Force technical direction and monitoring efforts would be ineffectual and time consuming for such a rapidly moving program. The Johnson Committee rule, number two, was written to require a type of modified operation. A team of highly qualified Air Force officers from Air Force Space Systems

Division were assigned the responsibility of directing this effort. This team spent a major portion of their time in residence at LMSC (approximately three days per week) and worked very closely with the LMSC engineering staff. Members of the team attended a large number of the technical and policy meetings, assisted in the discussions and in arriving at decisions. By being present during these formative discussions, there were minimum delays in obtaining Air Force approvals. Personal contact with all engineering personnel was fostered. The Air Force had complete access to LMSC internal correspondence, calculations and engineering data which was a substantial assistance in monitoring the development program.

4. Although the S-01A Program personnel spent a major portion of their time at LMSC, the program team was normally split between their AFSSD and LMSC offices. To eliminate delays, a direct phone line was installed between the two offices. This provided a rapid means of communication and has proved very effective. Formal correspondence and paperwork has been kept to a minimum. Internal LMSC engineering reports, design reviews and analysis have been used throughout the program. Formal agreements have been recorded as memorandum of understanding or memorandum for the file.

D. Vehicle Acceptance Procedures

1. The team concept of acceptance as used on Agena Bs has been instituted for the Agena Ds. It is planned that after the detail

specification, test specification, and test procedures have been approved and thoroughly tried out, the acceptance of vehicles will become the responsibility of the Air Force Plant Representative. In the interim, however, the Acceptance Team currently consists of three members of the AFSSD S-01A Directorate, one of whom serves as Chairman, two members from the Air Force Plant Representative Office (Quality Assurance), a member from the Air Force using program office, and a member from the LMSC using Program office.

2. Acceptability of the vehicle for delivery to the Government is determined by review of the test results during the assembly process at the rack and module level, and during final system test, and through physical inspection of the vehicle. A final integrated system test is made prior to acceptance of the vehicle. This test run simulates a representative ascent mission and exercises all equipment to be used in the vehicle. The data is then processed and made available for review by the Acceptance Team. An acceptance data table (Table 5) is completed for ease of review. Also, the vehicle log is provided which gives a complete story of the vehicle from beginning of assembly until it is offered to the Air Force for acceptance. After completion of the system test and analysis of the data, the vehicle is thoroughly inspected by the LMSC inspection organization, which is followed by the LMSC engineering staff inspection. After working off all discrepancies, it is turned over to the Air Force for physical inspection. The engineering members of the Acceptance Team and the AFPR (QA) Inspectors then inspect the vehicle.

3. After physical inspection of the vehicle and review of the data, a formal acceptance meeting is held. At that time, an LMSC letter certifying the vehicle's acceptability to applicable design and specification is provided, signed by the LMSC Agena D Program Director. The meeting is held primarily to provide answers to the Air Force on any problems, omissions, discrepancies that have been uncovered. The acceptability of the vehicle to the terms of the contract is determined at this time. Should the vehicle be unacceptable, a detailed listing of discrepancies is formally provided to LMSC for necessary corrective action and subsequent reoffer of the vehicle. The contractual aspects of the incentive fee pertaining to schedules has been formally documented by memorandum between the LMSC Program Director and the Air Force Program Director.

V. SUMMARY CONCLUSIONS

A. Unique Accomplishments. Following is a listing of significant 'firsts' which will be accomplished under the Agena D contracts:

a. First CPIF contract between LMSC and the Air Force.

b. First CPIF contract to be negotiated in which the performance fee aspects are adjudged unilaterally by a board of Air Force officers upon completion of the flight test program.

c. First AFSSD procurement of spares to a definitive list.

d. First development program in which all components will have been formally qualified for flight before first flight.

e. First 'procurement package' for a space vehicle.

f. First program to incorporate semi-automatic checkout equipment in system test.

g. First 'fixed price' procurement of a space vehicle.

h. First formal Configuration Control Board established for a space program.

B. Lessons Learned. The following may be cited as lessons learned to date through the CPIF development/engineering contract:

a. The incentive features of the contract coupled with the willing acceptance of the challenge of the accelerated schedule by the Contractor, in large measure have been responsible for the high motivation and unusual productivity of the Agena D program.

b. Without question, the incentive features of the contract have contributed to increased emphasis on cost control by the contractor and resulted in all scheduled deliveries being met thus far.

c. The reimbursable concept of funding the production contracts for boosters and stages is highly endorsed for it permits an orderly production flow to be established, economical lot buys and fixed price contracts to be negotiated, configuration control to be effectively exercised, costs to be held down and, in general, better management to be exercised.

d. The paradox of the relaxed formal documentation requirements and "skunk-works" approach of the accelerated program to the stringent controls necessary for effective management of a CPIF contract make it difficult for the Air Force Program Director to satisfy both objectives without compromise. In large measure, through the close working relationship and cooperation of both parties, it is believed that this has been accomplished.

e. Future CPIF contracts would be facilitated - in the negotiation phase - through the use of a more definitive work statement than was prepared for the Agena D program.

f. The accounting system evolved for the CPIF contract indirectly should result in more accurate costing for all LMSC programs.

g. It has been established that through a close working relationship with the Contractor, it is possible to eliminate the requirement for many reports, meetings, etc., and, in general, reduce documentation. This has not been accomplished without personal inconvenience to members of the Air Force program team who routinely spend three to five days per week on TDY. Should other high priority programs adopt the Agena D approach, it is recommended that PCS be considered as a possible means of eliminating this objectionable aspect.

h. Configuration Control is a mandatory prerequisite to effective standardization of design and should enhance reliability and quality control.